

Dynamics of total surface bacteria and bacterial species counts during desiccation in the Malaysian sea lettuce, *Ulva reticulata* (Ulvales, Chlorophyta)

Abstrak

The present study illustrates the dynamics of surface bacteria during post-harvest desiccation of *Ulva reticulata* Forsskal. Algal fronds were subjected to desiccation for 31 days. The total surface bacteria and bacterial species counts were monitored for moisture content and water activity index (a_w). There was an 86% decrease in total algal moisture content. However, a_w showed a more gradual decrease. The total bacterial count increased in the first week, reaching a maximum on day 7. After this, there was a drastic drop in the total bacterial count until day 14, and then a more gradual decline towards the end of the process. Six species of bacteria were isolated throughout this process: *Azomonas* sp., *Aeromonas hydrophila*, *Vibrio alginolyticus*, *Escherichia coli*, *Proteus vulgaris* and *Vibrio parahaemolyticus*. The dynamics of each of these bacterial species exhibited trends similar to the total bacterial count. Based on these findings, the drastic decrease in the total bacterial count after seventh day of desiccation could not be attributed to the a_w or salinity. Therefore, the possible exposure of these bacteria to the algal internal fluid upon the rupture of the thallus cells was seen as the most likely reason for the drop in the bacterial population. Scanning electron microscope micrographs taken after the tenth day of desiccation showed the presence of cracks and areas where the bacteria were exposed to the algal internal fluid. In vitro antibacterial tests of three different solvent extracts of *Ulva reticulata* were also carried out against these surface bacteria to verify the antibacterial potential of its internal fluid. It was apparent that all these surface bacteria were inhibited by at least one of the three extracts, and there were indications of the possible presence of multicomponent antibacterial potential, since extracts of different polarity showed bacteria-specific activity. Hence, it is possible that *Ulva reticulata* has the potential to protect itself against the opportunistic bacteria present on its surface and in its environment.